FLASH
Strengthening Homes & Safeguarding Families

Partners in Prevention

Volume 19, Issue 3, March 2017

Partner Spotlight—Dr. Ernst Kiesling

This month, FLASH had the honor of spending time with Dr. Ernst Kiesling, Research Professor at the National Wind Institute at Texas Tech University, and Founder and Executive Director of the National Storm Shelter Association (NSSA).

With a Ph.D. in Engineering from Michigan State University, Kiesling has a wealth of knowledge and experience in engineering safer outcomes for vulnerable populations. His 50 years of leadership and service in mitigation engineering is remarkable, not only for his long-standing dedication to the field and his students, but also – and most especially – for the conception, design, and development of tornado safe rooms.

FLASH: Dr. Kiesling, it's great to have you on board as a FLASH Leadership Partner in Prevention. Can you tell us how you got involved with FLASH?

ERNST KIESLING: Soon after Leslie Chapman-Henderson became President and CEO of FLASH, she accepted an invitation to visit Texas Tech. When I met her, her magnetic personality and the message she carried really attracted my interest. That's what led to my participation in FLASH. I have been a follower and admirer ever since. I marvel at the quality of programs and meetings that FLASH presents.

FLASH: We are certainly glad you followed up on your interest in FLASH, which is powered by partners like you.

Your record of involvement in mitigation engineering is a long one. How did you get interested in disaster safety and would you explain how the concept of the tornado safe room began?

ERNST KIESLING: Following the 1970 F5 tornado in Lubbock, Texas, a team of faculty in the Texas Tech Civil Engineering Department began post-storm damage documentation studies to learn more about tornado wind speeds, wind-induced damage, and mitigation strategies.

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I believe it was 1972 when the team visited Burnet, a town in central Texas. There we saw a damaged residence with no roof and several walls destroyed. Near the center of the house was a small pantry; the walls of which remained standing. Observing this, we conceived the idea of an above-ground storm shelter. We realized that for minimal cost a small room could be hardened and stiffened to provide a high degree of occupant protection from extreme winds. Further inspiration for the concept emerged a couple years later while investigating the rubble in Xenia, Ohio (Figure 2), where an interior bathroom had survived the storm. We never imagined that these ideas would give birth to an industry.

Figure 1 - Burnet

Fig 2 – Xenia, Ohio

Research ensued to develop design criteria for wind speeds, debris impact resistance, ventilation, space requirements, and the like. Developments in design continued to emerge throughout the 1970s, 80s and 90s. Use of the storm shelter concept was minimal since there were relatively few people who knew about the concept or the availability of designs.

All that changed in 1997 when a deadly tornado struck Jarrell, Texas. That tornado received widespread media coverage, presenting along with it nationwide television coverage of the concept of the aboveground storm shelter. With video footage of debris-impact testing being broadcast for the first time around the country, public interest soared. In response, FEMA published and distributed in August of 1998, 200,000 copies of the first edition of the FEMA 320 booklet *Taking Shelter from the Storm*. Strong demand for storm shelters was almost immediate. It continues to the present day.

FLASH: It has been said that the Wind Engineering Research Center reported more than 1,000 requests for shelter plans in the span of one week. The necessity for safe rooms finally reached the attention of builders and community organizations.

ERNST KIESLING: Yes, and this development brought with it the need for better quality control standards. In 1999, the Oklahoma City tornado hit. This gave rise to the first shelter incentive grant program, which in turn stimulated interest in storm shelters among consumers and providers. At that point, the noticeable lack of consistent quality in manufactured storm shelters became apparent.

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In response, the NSSA was formed to rectify the situation. The stated purpose of the NSSA was, and continues to be, the fostering of high-quality design implementations for the shelter industry. When I was elected NSSA Executive Director in 2000, a major task was to write a standard for the design and construction of storm shelters. The industry standard developed in 2001 was the forerunner of the NSSA/ICC-500 Standard, which was first published in 2008. That standard, along with subsequent revisions, remains the only consensus standard available for the design and construction of storm shelters.

FLASH: Your work to develop the NSSA/ICC-500 standards remains an essential contribution to the field of mitigation and disaster safety. So, what do you think is moving forward the cause of resilient building?

ERNST KIESLING: Gradual improvements are being made in the resiliency of newly constructed buildings. However, overall progress will be much slower because of the difficulty and cost of retrofitting existing buildings that comprise the vast majority of the building inventory. In only the most hazard-prone regions can we motivate people to make substantial investments to improve their safety from extreme, albeit infrequent, events. So progress toward resilience is slow, and safety advocates are challenged to be patient but persistent.

As for driving the cause of resilience forward, many forces are at work doing just that. FLASH was among the earliest advocates and continues to emphasize the benefits of adopting and enforcing the most current building codes. FEMA and its contractors, such as AECOM, also do outstanding work by producing guidelines and educational programs for hazard reduction. The National Windstorm Impact Reduction Act, involving four agencies and coordinated by the National Institute of Standards and Technology, is just now coming into being. As the leader in building codes, the International Code Council is emphasizing wind-hazard reduction and occupant safety by requiring protection in new schools and first responder facilities in the *2015 International Building Code* (IBC). And, of course, the NSSA continues to identify and work with designers and producers of storm shelters to improve quality and promote awareness of how shelters provide public safety.

FLASH: Can you tell us about a specific project you are working on in the resilience field?

ERNST KIESLING: I continue to work to maintain high-quality standards for both residential and community storm shelters. Largely because of the 2015 IBC requirements for storm protection in a broader spectrum of buildings, activity to design storm protection for new schools has become brisk. Demand is high for education and quality control in this relatively new, rapidly expanding endeavor. Through NSSA, I am working to respond to this demand.

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FLASH: Disaster safety for schools presents a uniquely critical challenge for our nation. We are grateful for your work in the development of storm shelters that we depend on today, and we thank you for your current efforts to integrate IBC requirements into schools. Do you have any other comments or words of wisdom for our readers?

ERNST KIESLING: Whether there is need for innovation adoption, code changes, building improvements, or the altering of popular mindsets, major change takes time, sometimes decades. The persistent and patient efforts of those with understanding will yield change, while a lack of persistence and patience results in the death of many good ideas. So my advice is “hang in there” and continue working to advance the ideas you believe in. Your work will attract others who will reward your good ideas by following and supporting them.

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